Simulation   **University of the Ryukyus**
3-rd year undergraduate   **Faculty of Engineering**
2002-2-18   **Department of Information Eng.**
Time: 90 minutes   (write answers in boxes)   Prof. M.R. Asharif
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Use the table-look-up method to simulate random variables X from U(0,1).

 Where the p.d.f of X is: f(x)=1/(1+x)   *10%*
       (Hint: see page 95)

Simulate the random variable X with the following probabilities:
       (Hint: see page 93)

 From a U(0,1) in the following table: *15%*

3- The mixed congruential generator: EMBED Equation.3   (mod 4)
has full 4 cycle-length. With seed EMBED Equation.3 , simulate 8 numbers, one after each.

                                                                               15%

             (Hint: See page 61)

4- Simulate the normal distributed random variables (N1, N2) by using Polar-Marsaglia method (rejection method) from each pair of the following uniform distributed random variables: *(Hint: See page 80)*

  (V1,V2)=(-0.7,0.9) , (V1,V2)=(-0.2,0.4),   (V1,V2)=(-0.6,-0.8)
                                                                               15%

5- Simulate a Binomial random variable X with B(8,0.6) from a set of uniform   random variables U (0,1), by using Bernouli random variable, where:
  U1=0.1, U2=0.8, U3=0.9, U4=0.2, U5=0.3, U6=0.7, U7=0.5, U8=0.4   *15%*
 (Hint: See page 82)

                               p=0.6

6-Simulate random variable X with geometric distribution and p=0.2 from U(0,1)=0.5
       (Hint: See page 93 Eq. 5.4)   *15%*

7- Suppose that we have a set of uniform random variables: U={0.7, 0.8, 0.9, 0.5}
simulate the exponential p.d.f. random variables, Ei, by using: Ei = - $\log_e$ U.

5%

Then, from this set {Ei}, simulate a random number, K, with Poisson distribution.
(Hint: See page 83)   *10%*

I	0	1	2	3	4	5	6
Pr [X<I]	0.2	0.3	0.6	0.7	0.9	0.92	0.95

X=

E1=   , E2=   , E3=   , E4=

x(0)=1 ,x(1)=   ,x(2)=   ,x(3)=   ,x(4)=   , x(5)=   ,x(6)=   ,x(7)=

(N1,N2)=   ,   (N1,N2)=   , (N1,N2)=

X=

X=

U	0.15	0.55	0.35	0.65	0.75	0.85	0.93
X							

K=